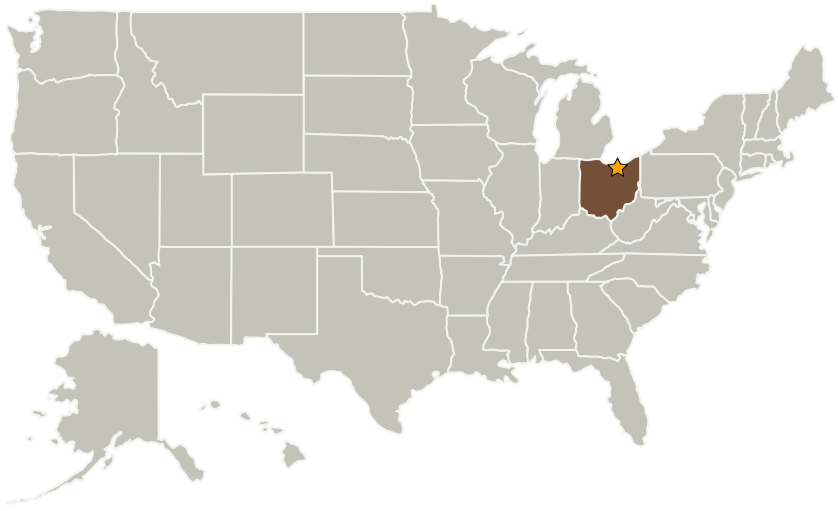
Long-Life, Oil-Free Polymeric, Multi-Roller Traction Drives for Planetary Vehicle Surface Exploration, Phase I

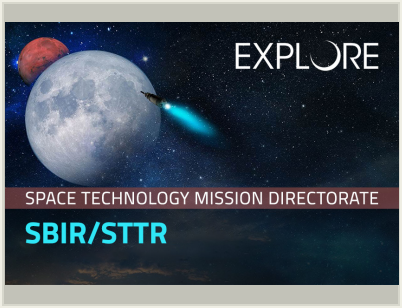
Completed Technology Project (2006 - 2006)

Project Introduction

Multi-roller traction drives have several advantages relative to geared units for aerospace and commercial drive applications. Among these are zero backlash, low torque ripple, compactness, light weight, and unlike gears, the potential to operate without liquid or grease lubrication. Current traction drives are made from heat treated bearing steels and require special traction fluids which limited their use to terrestrial applications. Space applications such as planetary vehicles operate in hostile environments. Innovations in material technology for non-lubricated operation will be required in order to benefit from the inherent advantages of traction drives relative to gears. Phase I work of this proposal will provide the basis for alternative nonmetallic materials to be substituted for bearing steel. These materials must have low wear but high traction characteristics. The proposed effort under Phase I will be used as a basis for a Phase II effort, in which one or more prototype systems will be designed, built and tested for space exploration applications. Applications include robotic arms, speed and torque balanced drives for scientific instruments and zero torque reaction drives for planetary vehicles.

Primary U.S. Work Locations and Key Partners





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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
Nastec, Inc.	Supporting Organization	Industry	Brook Park, Ohio

Primary U.S. Work Locations
Ohio

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX14 Thermal Management Systems
  - TX14.1 Cryogenic Systems
    - TX14.1.3 Thermal Conditioning for Sensors, Instruments, and High Efficiency Electric Motors